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ABSTRACT

The Learning in Science Project (1979-1981) studied the problems and difficulties of learning science at the 10-14 year old level in New Zealand to provide insights into the world of the science learner and provide an alternative perspective of the science classroom to that currently held by teachers and others. This paper offers practical suggestions on initiating and carrying out classroom interview data collection procedures used in the Learning in Science Project. The suggested do's and dont's of structured interviews, based on experiences in the Project discuss: (1) establishing contact with the teacher, (2) establishing contact with the pupil and (3) interviewing with the Interview-about-Instances method--a procedure for establishing a person's understanding of a particular word or the concept(s) a person associates with a particular word. (PN)

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LEARNING IN SCIENCE PROJECT

INTERVIEWING CHILDREN

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WORKING PAPER
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INTERVIEWING CHILDREN - A CHECKLIST FOR THE I.A.I. INTERVIEWER

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September 1981

The following comments and checklist evolved out of our work on the Learning in Science Project, 1979-1981. In this work we have been involved in classroom based research, as well as individual structured interview work using the interview-about-instances approach[1] (Osborne and Gilbert, 1979; Osborne and Gilbert, 1980; See also Appendix).

(a) Establishing Contact with the Teacher

In the parallel document to this paper called Working in classrooms - a checklist for the participant observer, a series of steps are suggested for establishing contact with the school, the class teacher and hence obtaining access to the children whom you wish to interview. The support of the school in which you are working is an essential prerequisite!

(b) Establishing Contact with the Pupil

The first problem is to gain the confidence of the pupil whom you wish to interview. Dress informally. Often there is an opportunity to gain rapport with the pupil on the way to the interview room and/or when the pupil first enters the room. Very casual conversation about the weather, "How are you getting on today?", and so on all helps to put him/her at ease. Sit down alongside, never opposite, the pupil. Do not have the tape recorder running.

As the pupil will still be suspicious and apprehensive he or she must be put further at ease. The best way to do this is to explain quite openly, clearly and honestly what you hope to get out of this interview and why. Here is a typical introduction.

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[1] Comments in this document are also relevant to the interview-about-events procedure (Osborne, 1980) - a procedure which, because it is more open ended, is possibly more difficult. We would recommend that a novice interviewer begin with the I.A.I. procedure.

"I guess you are wondering why you have been asked to come and have a chat with me? Well, let me try and explain. I am working on a project which is trying to help teachers teach better and pupils learn better. One of the problems, we think, is that teachers and pupils/students/ learners may have different meanings for different words - the teacher means one thing when he or she uses a word, but you might have a different meaning for that word. What we are trying to do is to find out what people of your age mean by certain words so that we can see if there are any differences between teachers' meanings and pupils' meanings. We have been talking to pupils of all different ages between 9 and 19, and we just want to talk to you about your meaning for one word. It is not a test; there are no right or wrong answers. I just want to get <u>your</u> meaning.

[LISP, 1980]

Then there is the need to clear the use of the tape recorder and put the pupil at ease over that.

"Now unfortunately I won't be able to remember everything that you say so I would like to use the tape recorder. If you say anything you are unhappy about then I will remove it from the tape before you leave. Nothing will be held against you! O.K.?"

Normally it is not advisable to make any more of an issue over this than the above. If you turn the tape on without waiting for a reply this suggests to the pupil that you don't see it as a big issue. Set the recorder up so it will pick up the pupil's responses most clearly. You as the interviewer will hopefully speak more clearly and can later interpolate what you were saying if it is not too distinct. Neither of these factors may apply with the person you are interviewing!

(c) <u>The Do's and Don'ts on Interviewing</u>

Interviewing is difficult. Do not be too depressed if you are unsatisfied with your first few interviews. Even if you have done 300 interviews you will never be completely satisfied. The aim is always to get better. As Ravenette (1977) has suggested, the skill of the interviewer is to know when to ask a question and what question to ask. In the I.A.I. approach, as with most interviews, the aim is to get the interviewee to talk. You, the interviewer, chose the topic, but what the interviewee says, and the way it is said, is most effective and useful if it does not need to be extracted laboriously by a long series of interviewer questions followed by mono-syllabic answers. Your aim is to get pupils to express their ideas in their own words. The interview is not an interrogation. The skill is to ask questions which show a genuine interest in the responses the interviewee makes and encourages pupils to respond further. Questions need to be easy for the pupil to answer

rather than difficult, neutral rather than leading, but on the other hand penetrating rather than superficial.

In the following we outline some do's and don'ts based on our own experiences. Many of the points pertain to the interview method in general and not just to the I.A.I. technique (for example, see Simons, 1979). In Table I an abbreviated checklist of most of the following points are given for quick reference.

1. It is important that the interviewer continually reiterates his or her stated interest in the pupil's meanings and is not looking for an answer which will be assessed with respect to some external criterion. For example consider;

I "Do you know why the person might be able to see the candle?"
I "Do you know how the eyes work?"
I "Do you know what happens to the sunlight on the moon?"

These questions would have been much better if they had been phrased differently. For example;

I "Why do you think the person might be able to see the candle?"
I "What do you think happens to the sunlight on the moon?"
I "Can you explain to me the way you think the eyes work?"

The interviewer's tone of voice, expression, emphasis and intonation are important variables to consider, as they need to be encouraging but not suggestive of expecting any particular answer. Often a nod, smile or 'a-hum' can be given to maintain communication and put the student at ease. However, care must be taken not to convey messages to the student other than those intended.

Teachers and ex-teachers have a particular problem when it comes to the neutrality aspect of the I.A.I. technique. Almost unconsciously when teachers interact with pupils individually, they often lead them through a series of questions which lead the pupil to a new conception. This is the exact opposite of the I.A.I. procedure. It is not the interviewer's

conceptions that we are trying to get into the pupil's head but the pupil's conception that we are trying to get into the interviewer's head. This complete turn around requires the teacher to make a major change in orientation which some find very difficult to do initially, either lapsing back to a teaching mode or at least to a mode wh.en is simply checking to see if the interviewee has the 'right' answer. Such a lapse is critically damaging to the tone of the interview. The interviewer is now seen by the pupil as not really interested in the pupil's answer. He or she is seen by the pupil as a teacher in disquise, giving the pupil an oral examination. On the other hand, if the interviewer can, both by word, emphasis, and mannerism, convey to the pupil that he or she is really interested in the pupil's view, whatever that view happens to be, then pupils respond and grow in confidence as the interview proceeds.

2. One of the advantages of the I.A.I. method is that the interview is a mixture of closed questions, e.g. "In your meaning of the words electric current is there a current in the battery?" which are simple to answer; and open questions, e.g. "Why do you say that?" which are penetrating. A balance of closed and open questions, of simple and difficult questions, of superficial and penetrating questions, of neutral and very specific questions is important. In this way it is possible to maintain pupil confidence but at the same time establish clearly the way the pupil thinks about the topic under discussion.

It is important to ensure that the penetrating follow-up questions are not leading. For example "What happens to the light?" is a better question than "Does the light stay around the candle?" The latter question has already made assumptions about the way the pupil views the situation. It also encourages a simple yes or no response. Such interview data is really of no value as evidence to support that a child has a particular view. The pupil merely agreed or disagreed with the interviewer's view, which is quite a different matter.

3. The interview technique enables the reasons behind a student's initial answer to be explored by including supplementary and exploratory questions. Listen carefully to the answers given and follow them up until you are quite confident that you fully understand the response. For example:

I "Does the mirror make light?"

S "You can get your reflection. If you shine a torch in to it, it'll make light."

I "What's a reflection?"

S "Something you look at and it does whatever you do."

(Light)[2]

I "You said all around it. Do you mean right around it (the torch)?"

S "No, just around the first part."

(Light)

4. A useful technique, particularly where the pupil gives an unanticipated answer, is to repeat the pupil's answer back to the student, as if mulling it over. This has a dual purpose:

(a) it checks that the pupil's response is audibly recorded on the tape, and

(b) it allows both the pupil and the interviewer time to think about the answer.

As an interviewer, one needs time to formulate a question to follow up a pupil response. Unanticipated responses are the high point of an I.A.I. interview and the interviewer can't afford not to follow them up. For example;

I "Does the rainbow make light?"

S "People say that God made it."

(Light)

Repeating the response of the pupil, e.g. "People say that God made it", also gives the pupil time to elaborate if they so wish.

Obviously if this technique was used continually the whole interview would become very stilted. On the other hand when a response is repeated, it is <u>critical</u> that it is repeated exactly. For example here is an example of poor interviewing.

I "What is steam made of?"

S "It is kinda like water?"

I "It is water."

S "Yes."

[2]This interview comes out of our LISP interview work on the topic of Light.

The pupil didn't say "It is water" and there is no justification for the interviewer's response. In I.A.I. we need pupil's responses - not agreement, or disagreement, with the interviewer's comment

5. The technique above of repeating the response, relates to the more general point of 'wait-time'; that is the time the interviewer waits for a response from the pupil. The interviewer needs to be patient. There is plenty of time. Pupils need time to formulate a response. Also do not butt in, if for no other reason than the interviewer must appear interested in everything the pupil has to say. On the other hand, it is possible to wait too long when no response is forthcoming. Practice is needed to judge how long a pupil requires to think a question through. Sometimes a little encouragement is required. For example:

I "I just want to get your meaning. Remember, there are no right or wrong answers."

I "Let me try and put that question another way."

I "Well, let's leave that now. We might come back to it later."

It is also important to realise that some children, particularly non-European children, will sometimes respond initially with a 'yes' simply to indicate that they understand the question. The interviewer must then wait for the answer to the question.

6. Sometimes pupils express doubt and hesitation. This should then be explored by the interviewer. For example;

P "I don't know"

I "You are not sure?"

P "No"

I "Can you tell me what you are not sure about?"

Often when a pupil says "I don't know" the pupil has lapsed back into assuming that the interviewer is looking for the 'right' answer. Frequently just repeating the question but re-emphasising "in your meaning of the word is ...." is sufficient to overcome the problem.

7. Sometimes pupils will misinterpret or misunderstand a question. This is interesting in itself and the interviewer may wish to explore this. On the other hand the interview technique also enables the interviewer to clarify the question and clear up any misinterpretations.

I "What happens to the light that it makes?"

S "You use it to see with."

I "Does it move anywhere, or does it stay around the candle?"

S "Stays around the candle."

(Light)

As a general point however the interviewer should be both interested in exploring and in clarifying.

8. As implied earlier the most important response is the unanticipated response for it indicates the pupil is thinking about things in quite a different way to the interviewer. Such responses need to be handled with delicacy as the aim is to appreciate the pupil's thoughts without distorting them with inappropriate questions.

If you do not understand a pupil's answer, do not ignore it but genuinely try to understand what the pupil is trying to tell you. e.g.

I "I am not quite sure I understand what you are trying to tell me. Could you tell it to me another way?"

Inevitably, unusual responses are not always seen as such in the interview setting. The reading of the transcripts often highlights a point not seen in the interview. For example:

I "Could you describe how it is that the person can actually see the sun?"

S "The same way as he could see the candle, except for, he couldn't go far enough away from the sun so he wouldn't see it. And when he's... unless the earth rotated quite fast he might."

(Light)

In this case the interviewer did not chase up on the comment about the earth's rotation. An appropriate question might have been

"Unless the earth rotated quite fast he might - Can you explain what you mean by that?"

Clarifying responses is awkward where a student gives a long reply and one does not want to interrupt in case it disturbs the student's line of thought. The interviewer must try to remember the various probe questions which he or she will inevitably formulate during the long response and introduce them into the interview when the pupil has finished responding.

If lapses in questioning do occur, all the interviewer can do is to be sensitive to them and attempt to concentrate harder on the pupil's answers in the next interviews. Such concentration is extremely demanding and for this reason not more than two interviews should normally be undertaken without a reasonable break. Good listening and questioning require hard and fast thinking!

9. Another reason why the interview is so demanding on the interviewer is that the interviewer needs to be sensitive to contradictory responses. These need to be explored fully and at every opportunity. For example;

I "Is the grass living?"

P "No, because it hasn't got a brain, doesn't eat."

I [Later] "Is a tree living?"

P "Yes, it moves and feeds on particles in the air and needs water, it needs fertiliser."

I "You said the grass wasn't living and yet you say the tree is."

P "Oh, it (the grass) is just like a tree, needs water and it moves by growing."

I "So why did you say that it was not living (before?")

P "Because it wasn't like us."

(Living)

Naturally the interviewer needs to <u>remember</u> pupil's earlier responses so that contradictions with respect to an earlier part of the interview can be picked up. This is another reason why not too many interviews should be attempted consecutively. It becomes increasingly difficult to remember if an earlier contradictory statement was made by the current interviewee or a previous one.

10. The interview technique also allows the opportunity for pupils to query the wording and meaning of a question. For example;

I "Does a heater make light?"

S "What kind of heater? One of those with the orange bars?"

(Light)

I "Is the book living?"

P "(Pause) I don't know what you mean."

I "Well, we'll start with another one. Is the boy living?"

P "Yes, ..."

(Living)

Be patient and supportive of this kind of questioning. It encourages pupils to see the interview as something different to the normal test situation.

11. The interview technique can be used with very young children. Those with a limited vocabulary and perhaps reading difficulties need have no problems as the questions are normally given orally. In reply pupils give their responses orally and by the use of gesture. However, it should be pointed out that young pupils may interpret the pictures literally.

I "Is the bird living?"

P "Yes, living; if he was dead, he's be lying on the ground and most probably be eaten by now."

(Living)

However, in the interview situation this problem can be overcome. In this particular situation the dead/alive perspective was able to be replaced by careful questioning to the living/non-living one. Young pupils may also focus on unanticipated details in the diagrams.

I "In your meaning of the word, is a cow an animal?"

P "It has four legs and not two like a bird. It is an animal."

I "Is there anything else about the cow that tells you it's an animal?"

P "Those things (pupil points to the udder) under there for feeding."

(Animal)

Again this is no problem and can be interesting in itself.

12. Occasionally despite all efforts to make the interview informal and non-threatening, a child will lose confidence, rather than gain it, as the interview proceeds. The pupils' responses tend to become mono-syllabic and the silences longer. Often it is best to abort such interviews.

With the shy, withdrawn child there is undoubtedly a major problem with the I.A.I. technique. Using the technique our knowledge of learners' concepts and cognitive systems comes from what they say or do. However, a child who does not talk in an interview cannot be categorised as knowing nothing. We have to accept this problem and can but assume that the views of such children are not scientifically different from their more talkative peers. Subsequent survey techniques following interview work can check this to some extent.

13. It is essential to read the question on each interview card to the pupil, or in some other way verbally identify the card you and the interviewee are discussing for a useful audiotape record. When transcribing and analysing data an interviewer statement such as, "Now, what do you think about this card/question?" is not helpful when you are not sure which card was actually being discussed at that time. This can be a particular trap for the unwary when an earlier card is reviewed to clarify an apparent contradiction in the interviewee's responses because now the cards are being discussed out of their normal sequence. "Let's compare your answers to these two cards", is inadequate. One needs to state something like "Let's discuss these two cards - the one with the seagull on it and the one with the whale on it." Again, where an interviewee refers to a card but doesn't mention it by name, the interviewer needs to make quite clear that it is <u>verbally</u> identified for the purposes of the audio tape record. For example;

S "If you go back to this card."
I "The one with the whale on it?"
S "Yes"
I "Hm Hm."
S "Well, I think that is not an animal..."

14. While the one-to-one situation enables the interviewer to get a response to every question he or she asks, the interviewer must be sensitive to the possibility that a pupil may just give an answer, any answer, just to avoid a silence. Subsequent questioning can investigate the depth of thinking upon which the answer is based. This is not a real problem, we believe, but the interviewer needs to be mindful of the possibility.

15. Sometimes a structured question or card may be intentionally passed over by the interviewer. This may be necessary if the pupil shows signs of exasperation at being asked what obviously to him or her is exactly the same question to which the reply is always the same. The only problem with this is that you can never assume that if the card had been shown the pupil would have definitely responded in the way predicted. This omission of the card may make the comparative analysis of the data from different pupils very difficult.

CONCLUSION

The interview-about-instances technique places a very heavy responsibility on the interviewer. She or he has to be skilled in the art of questioning and also knowledgeable in the content area under discussion to be able to assess pupils' responses immediately and make decisions about further questioning. Fortunately most of us improve with practice. Also, over a set of interviews on one particular topic, the interviewing becomes easier and more effective as fewer answers are given which are completely unanticipated and in transcribing earlier interviews the interviewer learns from his or her mistakes.

For the above reasons, if for no other, it is most desirable to transcribe tapes as soon as possible after an interview. It also means that the interviewer is more likely to remember what was said where the tape is indistinct. It should be pointed out all the above argues for the interviewer to transcribe the tapes personally.

Finally most of our novice interviewers have found it helpful to get a more experienced interviewer to sit in with them during the third or fourth interview. That is after they have first gained a little confidence! If the novice does one interview, and then the more experienced person does the next interview, this raises many useful discussion points. Alternatively, or in addition,

it can be most helpful to get an experienced interviewer to read the novice's transcripts and point out leading questions, responses that should have been explored further and so on. No interview, however experienced the interviewer, is so good it couldn't be improved, so there is no need to be embarrassed by your first mistakes!

This paper may have made it appear that effective interviewing is an impossible task. We hope you are not discouraged. The important thing is to get started. After a few interviews re-read this paper: it may be more meaningful, and hopefully helpful, at that stage. Good luck!

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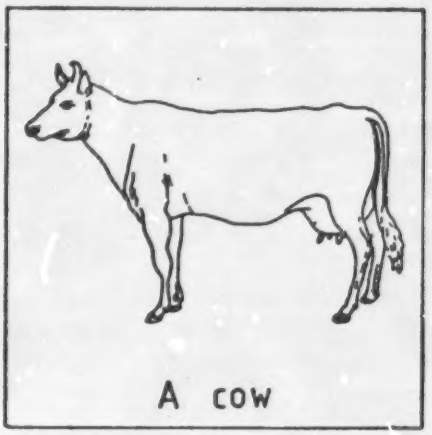
APPENDIX

The Interview-about-Instances Method

The I.A.I. method is a procedure for establishing a person's understanding of a particular word or the concept(s) a person associates with a particular word. Typically 20, or so, cards are used, each card depicting a particular situation or event, e.g. instances and non-instances of a particular concept.

The following are two cards from a set of cards used to explore the concept of 'living'.



The first question is always a simple closed question.
"In your meaning of the word living would you say that the cow is living?" The yes or no response is followed by "Why do you say that?" or "Could you explain to me how you think about that?" or simply "Tell me about that." Further questions follow, as appropriate, to clarify the pupil's thinking. The interviewer then moves on to the next card.

TABLE 1

CHECKLIST FOR THE INTERVIEWER

1. Try to clearly establish how and what the pupil thinks. Emphasize it is the pupil's ideas that are important and are being explored.	Do not give any indication to the pupil of your meaning(s) for the word or appear to judge the pupil's response in terms of your meaning(s).
2. Provide a balance between open and closed questions and between simple and penetrating questions. In so doing, maintain and develop pupil confidence.	Do not ask leading questions. Do not ask the type of question where it is easy for the pupil to simply agree with whatever you say.
3. Listen carefully to the pupil's responses and follow up points which are not clear.	Do not rush on, e.g. to the next card, before thinking about the pupil's last response.
4. Where necessary to gain interviewer thinking time, or for the clarity of the audio-record, repeat the pupil response.	Do not respond with a modified version of the pupil response; repeat exactly what was said.
5. Give the pupil plenty of time to formulate a reply.	Do not rush but on the other hand do not exacerbate embarrassing silences.
6. Where pupils express doubt and hesitation encourage them to share their thinking.	Do not allow pupils to think that this is a test situation and there is a right answer required.
7. Be sensitive to possible misinterpretations of, or misunderstanding about, the initial question. Where appropriate explore this, and then clarify.	Do not make any assumptions about the way the pupil is thinking.
8. Be sensitive to the unanticipated response and explore it carefully and with sensitivity.	Do not ignore responses you don't understand. Rather follow them up until you do understand.
9. Be sensitive to self-contradictory statements by the pupil.	Try not to forget earlier responses in the same interview.
10. Be supportive of a pupil querying the question you have asked, and in this and other ways, develop an informal atmosphere.	Do not let the interview become an interrogation rather than a friendly chat.
11. Read the question out loud to pupils.	Do not rely on pupils' reading ability.
12. Where all efforts to develop pupil confidence fail, abort the interview.	Do not proceed with an interview where the pupil becomes irrevocably withdrawn.
13. Verbally identify for the audio record, the pupil's name, age and each card as it is introduced into the discussion.	Do not return to earlier cards without verbal identification for the audio-record.
14. Be sensitive to the possibility that pupils will give an answer simply to fill a silence.	Do not accept an answer without exploring the reasoning behind it.
15. Appreciate that a card omitted will result in missing data.	Make no assumption about the way a pupil would respond to a particular card.